

19. (New) The semiconductor device according to claim 16, wherein the conductive connection member includes a bonding wire.

20. (New) The semiconductor device according to claim 16, wherein a thickness of the Ta film is 5 nm or less.

21. (New) The semiconductor device according to claim 20, wherein a thickness of the Ta film is 20 nm or more.

22. (New) The semiconductor device according to claim 20, wherein a thickness of the Ta film is 40 nm or more.--

REMARKS

In this Amendment, Applicants have cancelled claims 3 – 12 without prejudice or disclaimer of the subject matter therein, amended claim 1 to more appropriately define the present invention, and added new claims 13 – 22 to protect additional aspects of the invention. In accordance with the requirements of 37 C.F.R. § 1.121(c)(1), Applicants provide a marked-up version of the amendments to claim 1 in an attached Appendix designated “Version of Claim with Markings to Show Changes Made.” Claims 1, 2, and 13 – 22 remain pending.

In the December 26, 2001 Office Action, the Examiner rejected claims 1 – 8 under 35 U.S.C. § 103(a) as unpatentable over Chittipeddi, et al. (U.S. Patent Application Pub. No. US2001/0036716A1) in view of Michio (Japanese Patent Application Pub. No. 63-128648); and rejected claims 9 – 12 under 35 U.S.C. § 103(a) as unpatentable over Chittipeddi in view of

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Maekawa (U.S. Patent Application Pub. No. US2001/0009804A1). The rejection of claims 3 – 12 has been rendered moot by the cancellation without prejudice or disclaimer of these claims.

Regarding the 35 U.S.C. § 103(a) rejection of claims 1 – 8, Applicants disagree with the Examiner's arguments and conclusions. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. ... If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious." See M.P.E.P. § 2143.03, 8th Ed., Aug. 2001, p. 2100-26. Furthermore, regarding dependent claim 2, "Examiners are reminded that a dependent claim is directed to a combination including everything recited in the base claim and what is recited in the dependent claim. It is this combination that must be compared with the prior art, exactly as if it were presented as one independent claim." M.P.E.P. § 608.01(n)(III), p. 600-77. The Examiner does not show that all the elements of Applicants' claims are met in the cited references, taken alone or in combination, and does not show that there is any suggestion or motivation to modify the cited references to result in the claimed invention.

Applicants' claim 1 recites a combination of elements including, *inter alia*, "a Cu film provided above a main surface of a semiconductor substrate and used as a wiring; an intermediate layer formed at least on the Cu film, the intermediate layer comprising a TaN film formed on the Cu film and a Ta film formed on the TaN film, and an Al film formed on the Ta film and used as a pad."

Neither Chittipeddi nor Michio, taken alone or in combination, teaches or suggests at least this recitation of Applicants' claim 1. The Examiner alleges that "Chittipeddi shows generally that layers of the refractory metals and refractory metal nitrides can be combined to form an intermediate barrier layer, but does not state any specific combination, however Michio utilizes a Ti/TiN barrier layer between a copper and aluminum metal layer" (Office Action, p. 2).

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Neither Chittipeddi nor Michio teach or suggest at least an intermediate layer comprising a TaN film formed on the Cu film and a Ta film formed on the TaN film. Thus, Chittipeddi and/or Michio, taken alone or in combination, do not teach or suggest each and every element of Applicants' claim 1.

The Examiner alleges "[i]t would have been obvious to one of ordinary skill in the art to form the barrier layer of Chittipeddi with a Ti/TiN intermediate layer in order to improve the bonding property as taught by Michio" (Office Action, p. 2). While Michio's Figure 1 teaches a Ti layer 5 and TiN layer 6, Michio does not teach "the intermediate layer comprising a TaN film formed on the Cu film and a Ta film formed on the TaN film, and an Al film formed on the Ta film and used as a pad" (Applicants' claim 1). This is clearly distinguishable from Applicants' claimed invention.

The Examiner has therefore not met at least one of the essential criteria for establishing a *prima facie* case of obviousness, wherein "the prior art reference (or references when combined) must teach or suggest all the claim limitations." See M.P.E.P. §§ 2142, 2143, and 2143.03.

As explained above, even a combination of Chittipeddi and Michio (if proper, which Applicants dispute) still would not produce Applicants' claimed invention. Since the combination of cited references does not teach all features of Applicants' claimed invention, there can be no suggestion or motivation in the cited references to modify Chittipeddi and/or Michio to produce Applicants' claimed invention.

Claim 1 is therefore patentable over the combination of Chittipeddi and/or Michio, as is claim 2 and new claims 13 – 15, at least by virtue of their dependence from allowable independent claim 1.

Finally, Applicants have introduced new claims 13 – 22 to provide coverage for other aspects of Applicants' invention. Applicants submit that new claims 13 – 22 are supported by

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the originally filed application, and therefore do not constitute new matter. Furthermore, new claims 13 – 15 depend from allowable base claim 1, and new claims 17 – 22 depend from allowable base claim 16. Neither Chittipeddi nor Michio, taken alone or in combination, teach or suggest the elements of new claims 13 – 22. Applicants have already established that the cited references do not teach or suggest at least Applicants' claimed "intermediate layer formed at least on the Cu film, the intermediate layer comprising a TaN film formed on the Cu film and a Ta film formed on the TaN film, and an Al film formed on the Ta film and used as a pad, the Al film having an extending portion under which the Cu film is not formed" (Applicants' claims 1 and 16). Therefore, Applicants submit that new claims 13 – 22 are patentable.


Applicants request that the Examiner withdraw the rejections under 35 U.S.C. § 103(a) for the reasons set forth above. Pending claims 1, 2, and 13 – 22 are in condition for allowance. A favorable action is requested.

Please grant any extensions of time under 37 C.F.R. § 1.136 required in entering this response. If there are any fees due under 37 C.F.R. § 1.16 or 1.17, which are not enclosed, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our deposit account 06-0916.

Respectfully submitted,

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